

In re Application of:
Thomas Maurer et al.
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Claim Listing:

1. (currently amended) A method for determining a state of a person in an image,
~~characterized by comprising:~~

automatically defining a region of interest in the image indicative of a predetermined
feature of the person using an early vision cue; and

automatically finding the location of the predetermined feature in the defined region of
interest using elastic bunch graph matching.

2. (currently amended) A method for determining the state of a person as defined in
claim 1, wherein ~~characterized in that~~ the step of defining the region of interest includes roughly
locating the region of interest using the early vision cue and the step of finding the location of the
predetermined feature commences at a rough location provided by the step of defining the region
of interest.

3. (currently amended) A method for determining the state of a person as defined in
claim 2, wherein ~~characterized in that~~ the early vision cues includes at least one of stereovision,
motion, color, convexity, topology, or structure.

4. (currently amended) A method for determining the state of a person as defined in
claim 3, wherein ~~characterized in that~~ stereovision is used to produce disparity histograms and
silhouette images.

5. (currently amended) A method for determining the state of a person as defined in
claim 1, wherein ~~characterized in that~~ the step of defining the region of interest includes
background suppression.

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6. (currently amended) A method for determining the state of a person as defined in claim 1, wherein characterized in that the predetermined feature is the person's face and the state of the person is described by node nodes positions of facial elements.

7. (currently amended) A method for determining a state of a person as defined in claim 1, wherein characterized in that the image is in a sequence of images and the location of the predetermined feature is tracked in a subsequent image.

8. (currently amended) A method for determining a state of a person as defined in claim 7, wherein characterized in that an erroneous location of the predetermined feature is corrected based on a model of typical facial features.

9. (currently amended) A method for determining a state of a person as defined in claim 7, wherein characterized in that the method further comprises reinitializing the tracking of the location of the predetermined feature based on a predicted location of the predetermined feature.

10. (currently amended) A method for determining a state of a person ~~feature sensing~~ as defined in claim 9, wherein characterized in that the reinitializing step is performed ~~performed~~ using bunch graph matching.

11. (currently amended) A method for determining a state of a person as defined in claim 7, wherein characterized in that the method further comprises using the location of the predetermined feature for animating a graphical head model.

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12. (currently amended) A method for ~~A method for~~ determining a state of a person as defined in claim 1, wherein characterized in that the state of the person determined by the method is the degree to which an eye is closed.

13. (currently amended) Apparatus for determining a state of a person in an image, ~~characterized by comprising:~~

means for automatically defining a region of interest in the an image indicative of a predetermined feature of the person using an early vision cue; and

means for automatically finding the location ~~in an image~~ of the predetermined feature in the defined region of interest using elastic bunch graph matching.

14. (new) Apparatus for determining the state of a person as defined in claim 13, wherein the early vision cue includes at least one of stereovision, motion, color, convexity, topology, or structure.

15. (new) Apparatus for determining the state of a person as defined in claim 14, wherein stereovision is used to produce disparity histograms and silhouette images.

16. (new) Apparatus for determining the state of a person as defined in claim 13, wherein the predetermined feature is the person's face and the state of the person is described by node positions of facial elements.

17. (new) Apparatus for determining a state of a person as defined in claim 1, wherein the state of the person determined by the apparatus is the degree to which an eye is closed.

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18. (new) A method for determining a state of a person in an image, comprising:
automatically defining a region of interest in the image indicative of a predetermined
feature of the person using an early vision cue; and
automatically finding the location of the predetermined feature in the defined region of
interest using elastic graph matching.

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19. (new) A method for determining the state of a person as defined in claim 18,
wherein the elastic graph matching uses a model graph having nodes associated with wavelet
jets.

20. (new) A method for determining the state of a person as defined in claim 18,
wherein the wavelet jets are based on Gabor wavelets.

21. (new) Apparatus for determining a state of a person in an image, comprising:
means for automatically defining a region of interest in the image indicative of a
predetermined feature of the person using an early vision cue; and
means for automatically finding the location of the predetermined feature in the defined
region of interest using elastic graph matching.

22. (new) Apparatus for determining the state of a person as defined in claim 21,
wherein the elastic graph matching uses a model graph having nodes associated with wavelet
jets.

23. (new) Apparatus for determining the state of a person as defined in claim 21,
wherein the wavelet jets are based on Gabor wavelets.

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24. (new) A method for determining a state of a person in an image, comprising:
automatically defining a region of interest in the image indicative of a predetermined
feature of the person using an early vision cue; and
automatically finding the location of the predetermined feature in the defined region of
interest using wavelet jet matching.

25. (new) A method for determining the state of a person as defined in claim 24,
wherein the wavelet jet matching uses a wavelet jet based on Gabor wavelets.

26. (new) Apparatus for determining a state of a person in an image, comprising:
means for automatically defining a region of interest in the image indicative of a
predetermined feature of the person using an early vision cue; and
means for automatically finding the location of the predetermined feature in the defined
region of interest using wavelet jet matching.

27. (new) Apparatus for determining the state of a person as defined in claim 26,
wherein the wavelet jet matching uses a wavelet jet based on Gabor wavelets.